National Climatic Data Center

DATA DOCUMENTATION

FOR

DATASET 6420a (DSI-6420a)

NOAA Research Flight Data (AOC)

January 29, 2004

National Climatic Data Center
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Asheville, NC 28801-5001 USA

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1. Abstract:

The WP-3D aircraft perform many projects throughout the year. Examples of these projects would be hurricane research, atmospheric chemistry, thunderstorm investigations, and winter weather missions. Each of these projects consists of a series of individual flights. For instance, during hurricane projects, the P-3 may fly numerous flights through different tropical cyclones.

For each archived project, there are multiple directories consisting of individual flights. The data in these flight directories contain the actual raw meteorological parameters obtained from sensors located in different positions on the aircraft. The data is initially written to a digital data tape on the aircraft and then later converted to a file for faster processing and archiving. Each flight folder also contains a scanned image of the actual flight manifest, the navigation log, and the mission observation logs.

The flight-level data file contains measurements acquired in one second intervals. The following is a generalized list of these measured parameters: Time, GPS position data, inertial data, radar altimeter measurements, liquid water, total temperature, dewpoint temperature, attack pressure, slip pressure, differential attack and slip pressures, and static and dynamic pressure. Depending on the needs of each individual project, other sources of data will be added or subtracted from this list.

2. Element Names and Definitions:

This is how the data are arranged on the AOC slow tape. The data are recorded as 16 bit HP words. Most of the data is recorded as integer counts and must be converted to volts and then to meaningful units. All of the navigation data is stored in a special format, and can only be read by performing special bit shifting operations. If examination of the raw navigation data is desired, ask AOC for a copy of the bit shifting subroutine called PACK.

Beginning with the 2000 Hurricane Season, locations 32-38 contain GPS data from the ASHTECH BR2G system (BR2G prefix).

This element table is for the NOAA42- N42RF-Aircraft during the 2003 Hurricane season, the Tamdar project, and a wind calibration flight.

Array Location	Description
1	Type of record (4)
2	Number of words in record (222)
3	MS byte: Slow tape ID LS byte: Aircraft #
4	Size of slow tape logical record = 220
5-10	Micro 29 time - yr,mo,da,hr,mn,sc
11-13	Time based generator 1 - hr,mn,sc; binary (not BCD)
14-16	Time based generator 2 - same as TBG 1
17-19	GPS time of fix - hr, min,sec; same as TBG's
20-21	GPS altitude - MS bit = -102400*32 ft
22-23	GPS latitude - MS bit = -PI*4 radians
24-25	GPS longitude - MS bit = -PI*4 radians

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 26-27        GPS north vel. - MS bit = -1638.4*2 knots
 28-29        GPS east vel. - MS bit = -1638.4*2 knots
 30-31        GPS vert. vel. - MS bit = -2048*2 ft/s
 32           BR2G GPS data Time; 0 - 3600, lsb = 1/100 sec
 33           BR2G GPS Altitude; +/- 32767, lsb = 1 ft
 34-35        BR2G GPS Latitude; msb = -PI*4 radians
 36-37        BR2G GPS Longitude; msb = -PI*4 radians
 38           BR2G GPS Status and Horiz Dilution of Precision
              bits 15,14: 00 - no position, 01 - uncorrected,
              10 - diff corrected, 11 - almanac used
              bits 13 - 8: number of satellites used,
              ls byte - HDOP 00 - 99

 39           Spare
 40           Collins GPS north accel. - MS bit = -128 m/s**2
 41           Collins GPS east accel. - MS bit = -128 m/s**2
 42           Collins GPS vert. accel. - MS bit = -128 m/s**2
 43           Collins GPS Chan 1 status 1 (see rcvr 3M specs for bit
assignments
 44           Collins GPS Chan 1 status 2 (same as status 1)
 45-52        Collins GPS Chan 2-5 status (same as chan 1 status 1&2)
 53           Collins GPS Figure of Merit word - see rcvr 3M spec.
              Note: Time FOM from word 64 is in reserved bits
              (12,11,5,4 in HP notation;  3,4,10,11 in Collins
              notation)
 54           Collins GPS expected horiz error - lS bit = 1 meter
 55           collins GPS expected vert error - lS bit = 1 meter
 56           Spare
 57-58        INE 1 Altitude - MS bit = -102400*32 ft
 59-60        INE 1 Latitude - MS bit = -PI*4 radians
 61-62        INE 1 Longitude - MS bit =-PI*4 radians
 63-64        INE 1 North Vel. - MS bit = -1638.4*2 knots
 65-66        INE 1 East Vel. - MS bit = -1638.4*2 knots
 67-68        INE 1 Vert speed - MS bit = -2048*2 ft/s
 69-70        INE 1 Drift Angle - MS bit = -PI*4 radians
 71-72        INE 1 Heading - MS bit = -PI*4 radians
 73-74        INE 1 Pitch Angle - MS bit = -PI*4 radians
 75-76        INE 1 Roll Angle - MS bit = -PI*4 radians
 77-96        INE 2 Data - Same as INE 1
 97           APN 232 RA data in meters; 1 sec avg
 98           Spare; 1 sec avg
 99           Spare; 1 sec avg
 100          RA - APN159 Synchro data in meters; 1 sec avg
 101          RA - APN159 digital encoder in meters
 102          # of INE bursts av'd this sec; MS byte:INE 1
                                             LS byte:INE 2
 103          GPS and APN232 RA burst count; ms nybble - GPS
              lat/lon/alt burst count, 2ND nyble - GPS velocity
              east/north/vert burst count, LS byte - APN232 RA
              number of words averaged this second.
 104          # of ISEC word 98 and 99 samples avg this second;
              ms byte- ISEC(98), ls byte- ISEC(99)
 105          Dig_Err: Error flags for Dig. Avg; bit 0 for APN232
 106          Spare
 107          ADC unit status - from ADC slow data burst
 108          IAU unit status - from IAU burst
 109          Operator selections: MS nybble - temp probe
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	nybble 2 - nav. unit nybble 3 - alt. source ls nybl - dewpoint unit
110	Status from Wing Wiring Junction Box
111	Status from Cloud Physics Station
112	Status from Flight Director Station
113	Spare
114	Event switch data - Nav, Sta1, Sta2, Sta3
115	Event switch data - Nrack, Sta5, C3X, Sta7
116	Event switch data - F/D, Pilot
117	Spare
118	Spare
119	Spare
120	Spare
121-129	Spare
130-140	Spare
141	M99 10 msec tic when time was read - use for clock drift tracking
142	J-W Liquid water
143	RMST TOTAL TEMP #1 (TT1)
144	RMST TOTAL TEMP #2 (TT2)
145	GENERAL EASTERN DewPointer (DW1)
146	AP Differential Alpha (attack) Pressure
147	DAP Dynamic Alpha Pressure
148	BP Differential Beta (slip) Pressure
149	DBP Dynamic Beta (slip) pressure
150	PSW Rosemount static pressure from wingtip(#1281)
151	PQW Rosemount dynamic pressure from wingtip(#1281)
152	RD Radiometer Down measures SST (PRT-5)
153	Spare
154	RS Side Radiometer (CO2)
155	Spare
156	Vertical Acceleration 2
157	Vertical Acceleration 1
158	RADOME ATTACK PRESSURE
159	RADOME SIDESLIP PRESSURE
160	RADOME DIFF. PRESSURE (RPQ)
161	RADOME IMPACT PRESSURE
162	RMST TOTAL TEMP #3 (Radome)
163	Spare
164	Spare
165	Spare
166	Dewpoint #2 EdgeTech
167	Spare
168	Spare
169	Dewpoint #3 (DW3) MayCom Laser Hygro
170	TMPQ
171	TNDS
172	TW1PS
173	King Liquid water
174	PSF - Static Pressure COPILOT ROSEMOUNT #1281 (FUSELAGE)
175	PQF1 - COPILOT ROSEMOUNT #1281 (FUSELAGE)
176	PQF2 - COPILOT ROSEMOUNT #1221F(FUSELAGE)
177	AFT FIELDMILL SENSITIVE
178	AFT FIELDMILL INSENSITIVE
179	AFT FIELDMILL SUPER INSENSITIVE
180	FIELDMILL HVPS CURRENT

181	FIELDMILL HVPS VOLTAGE
182	RIGHT FIELDMILL SENSITIVE
183	RIGHT FIELDMILL INSENSITIVE
184	RIGHT FIELDMILL SUPER INSENSITIVE
185	UP FIELDMILL SENSITIVE
186	UP FIELDMILL INSENSITIVE
187	UP FIELDMILL SUPER INSENSITIVE
188	Spare
189	Cabin Pressure (RSMT 1201F)
190	AXBT CHANNEL #1
191	AXBT CHANNEL #2
192	AXBT CHANNEL #3
193	OZONE TECO CARSEY
194	Spare
195	Spare
196	Spare
197	Spare
198	Spare
199	Spare
200	Spare
201	Spare
202	Spare
203	Spare
204	Spare
205	Up PRT-5 Radiometer
206-214	
215	DOWN FIELDMILL SENSITIVE
216	DOWN FIELDMILL INSENSITIVE
217	DOWN FIELDMILL SUPER INSENSITIVE
218	LEFT FIELDMILL SENSITIVE
219	LEFT FIELDMILL INSENSITIVE
220	LEFT FIELDMILL SUPER INSENSITIVE
221	Spare
222	Checksum for this second

3. Start Date: 19890709

4. Stop Date: Ongoing

5. Coverage:

a. Southernmost Latitude: 17.0 N
b. Northernmost Latitude: 29.0 N
c. Westernmost Longitude: -97.0 W
d. Easternmost Longitude: -62.0 W

6. How to Order Data:

Ask NCDC's Climate Services about costs of obtaining this dataset.
Phone 828-271-4800
Fax 828-271-4876
E-mail: **NCDC.Orders@noaa.gov**

7. Archiving Data Centers:

Name: National Climatic Data Center/NCDC
Address: Federal Building

151 Patton Ave.
Asheville, NC 28801-5001
Voice Telephone: 828-271-4800

Name: Aircraft Operations Center
Address: Science and Engineering Division
P.O. Box 6829
Macdill AFB, FL 33608-0829
Voice Telephone: 813-828-3310
Fax: 813-828-5061

8. Technical Contact:

Flight Director's Name: Martin Mayeaux or Paul Flaherty
Address: Aircraft Operations Center
P.O. Box 6828
Macdill AFB, FL 33608-0829
Voice Telephone: 813-828-3310
Fax: 813-828-5061

9. Known Uncorrected Problems:

None

10. Quality Statement:

Disclaimer: This data is the raw flight-level weather data that has not been quality controlled for sensor contamination or other instrument related errors.

11. References:

Merceret, F.J., and Davis, H.W., 1981: The Determination of Navigational and Meteorological Variables Measured by NOAA/RFC WP3D Aircraft.